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Report No. P-4372-BA

REPORT AND RECOMMENDATION  
OF THE  
PRESIDENT OF THE  
INTERNATIONAL DEVELOPMENT ASSOCIATION  
TO THE  
EXECUTIVE DIRECTORS  
ON A  
PROPOSED CREDIT OF SDR 12.3 MILLION  
TO THE  
SOCIALIST REPUBLIC OF THE UNION OF BURMA  
FOR  
YE-U IRRIGATION REHABILITATION AND MODERNIZATION PROJECT

August 7, 1986

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### CURRENCY EQUIVALENTS

1.00 Kyat (K) = US\$0.114  
K 8.80 = US\$1.00

### WEIGHTS AND MEASURES

1 inch = 2.540 centimeters (cm)  
1 foot (ft) = 0.305 meters (m)  
1 mile (mi) = 1.609 kilometers (km)  
1 acre (ac) = 0.405 hectares (ha)  
1 pound/acre (lb/ac) = 1.121 kilograms/hectare (kg/ha)  
1 pound (lb) = 0.454 kilograms (kg)  
1 ton (long ton - 2,240 lbs) = 1.016 metric tons  
1 imperial gallon (Ig) = 4.546 liters (l)  
1 cubic foot/second (cusec) = 0.028 cubic meters/second  
1 acre-foot (ac ft) = 1,233 cubic meters (m<sup>3</sup>)  
1 cubic yard = 0.765 cubic meters

### ABBREVIATIONS AND ACRONYMS

AC - Agriculture Corporation  
ERR - Economic Rate of Return  
FAO/CP - Food and Agriculture Organization/Cooperative Program  
HYV - High Yielding Varieties  
ID - Irrigation Department  
K - Kyat  
M - Million  
MAF - Ministry of Agriculture and Forests  
O&M - Operation and Maintenance  
PCC - Project Coordination Committee  
PU - Project Unit  
SEEs - State Economic Enterprises  
UNDP - United Nations Development Programme  
SHYP - Special High Yielding Program

### BURMA FISCAL YEAR

April 1 - March 31

BURMA

YE-U IRRIGATION REHABILITATION AND MODERNIZATION PROJECT

CREDIT AND PROJECT SUMMARY

Borrower: The Socialist Republic of the Union of Burma

Amount: Special Drawing Rights (SDR) 12.3 million  
(US\$14.0 million equivalent)

Terms: Standard

Project Description: The Project would be the first in a series of major investments for rehabilitation and modernization of large river diversion systems that account for about 35% of the area under irrigation in Burma. It would provide for comprehensive repair and modernization of the Ye-U system (with a cultivable command area of 121,000 acres), and for complementary agricultural services to project area farmers. The project would also strengthen the Irrigation Department (ID) by developing (a) a nationwide Master Plan for irrigation rehabilitation and improved operation of at least five large diversion systems with a combined area of 500,000 acres, and (b) a comprehensive national program for management (especially maintenance) of ID's large and growing fleet of heavy equipment. Institutional strengthening would be achieved through the provision of limited but essential technical assistance and upgraded mechanical workshop facilities. By rehabilitating badly-deteriorated irrigation infrastructure, the project would provide more reliable supply of irrigation water to about 20,000 farm families in the Ye-U command area. Combined with improved water management, extension, and input supply, this would lead to increased cropped area, higher yields, and an expansion of overall production of rice and pulses.

Risks: No adverse environmental impact is expected. Nationwide shortages of fuel and cement have delayed implementation of earlier irrigation projects; however, these shortages should be alleviated by the completion in 1986-87 of several major irrigation projects.

Estimated Costs: a/

	<u>(US\$ Million Equivalent)</u>		
	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
Irrigation Civil Works	5.96	0.22	6.18
Earthmoving Equipment	1.31	4.11	5.42
Construction Supervision	2.34	0.49	2.83
Institutional Strengthening	0.41	1.41	1.82
Mechanical Workshops	0.59	2.41	3.00
Physical Contingencies	1.22	0.76	1.98
Price Contingencies	<u>3.36</u>	<u>1.55</u>	<u>4.91</u>
Total Project Cost	15.19	10.95	26.14

a/ Include taxes and duties of US\$1.8 million equivalent.

Financing Plan:

	<u>(US\$ Million Equivalent)</u>		
	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
IDA	4.8	9.2	14.0
UNDP	-	1.8	1.8
Government	<u>10.3</u>	-	<u>10.3</u>
Total	15.1	11.0	26.1

Estimated Disbursements:

<u>IDA FY</u>	<u>(US\$ Million Equivalent)</u>						
	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>
Annual	0.0	0.4	5.4	3.6	2.3	1.5	0.8
Cumulative	0.0	0.4	5.8	9.4	11.7	13.2	14.0

Economic Rate of Return:

20%

Staff Appraisal Report:

No. 5524-BA of July 14, 1986

Maps:

IBRD No. 18409; IBRD No. 18706

INTERNATIONAL DEVELOPMENT ASSOCIATION

REPORT AND RECOMMENDATION OF THE PRESIDENT  
TO THE EXECUTIVE DIRECTORS  
ON A PROPOSED CREDIT  
TO THE SOCIALIST REPUBLIC OF THE UNION OF BURMA  
FOR THE YE-U IRRIGATION REHABILITATION AND MODERNIZATION PROJECT

1. I submit the following report and recommendation for a proposed Development Credit to the Socialist Republic of the Union of Burma for SDR 12.3 million (US\$14.0 million equivalent) on standard IDA terms to help finance the Ye-U Irrigation Rehabilitation and Modernization Project. UNDP would grant US\$1.8 million equivalent to finance the technical assistance component.

PART I - THE ECONOMY 1/

2. The latest economic report entitled, "Burma: Policies and Prospects for Economic Adjustment and Growth" (Report No. 4814-BA, dated November 18, 1985) was distributed to the Executive Directors on December 5, 1985 and its findings are included in this section. Country data are presented in Annex I.

3. The present leadership of Burma assumed the responsibilities of government in 1962, and vested authority in a revolutionary council. Thereafter, a constitution was adopted in a nationwide referendum in December 1973, creating the Pyithu Hluttaw (People's Assembly) with supreme executive, legislative, and judicial authority. The Burma Socialist Program Party (BSPP) was confirmed as the only authorized political party. The Government's guiding philosophy, stated in a 1962 document entitled "The Burmese Way to Socialism", reflects a combination of traditional Burmese values and socialist doctrine. Despite the political stability of Burma's leadership, insurgency has been a problem in large areas of the country.

4. The Government's economic development strategy is summarized in the Twenty-Year Plan adopted in 1972. The Government's main economic objectives are to foster economic growth within the context of a socialist system, to enhance economic strength and self-sufficiency through transformation from an agricultural to an agriculture-based industrial society, to eliminate unemployment, and to reduce income disparities.

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1/ This part is substantially the same as Part I of the President's Report for a Grain Storage and Processing Project for Burma (Report No.P-4305-BA), that was approved by the Executive Directors on May 29, 1986.

5. The publication of the Twenty-Year Plan was followed by a wide range of reforms and policy changes, the most important of which was the introduction in 1976 of tax measures which, accompanied by a round of price and tariff increases, helped restore the country's public finances to a sounder basis. To encourage the state sector to operate more efficiently, the Government also introduced in 1974 a new financial system for the State Economic Enterprises (SEEs) and authorized greater managerial authority and work incentives for them.

6. In the area of agriculture, the Government launched in the mid-1970s a successful intensification program for paddy (the Special High Yielding Program (SHYP)). Now extended to 50% of total paddy-sown land, the program has combined increased availability of inputs (improved seeds and fertilizers), and a greatly expanded and strengthened extension service, with skillfully orchestrated institutional and political support at the township level, resulting in substantial gains in yields and production.

7. As a result of these measures and of generally favorable weather conditions, improving terms of trade and increased flows of concessional foreign aid, Burma made impressive economic progress during its Second and Third Four-Year Plan periods (1974/75-1981/82). Real gross domestic product (GDP) grew by an annual average of 6% during the period, compared with 2.7% in the previous decade. Gross fixed capital formation increased as a share of GDP from 10% in 1974/75 to 20% in 1981/82; the share of domestic savings in GDP similarly increased from 11% to 17% over the same period. Significant improvements in the Government's budgetary position also occurred, allowing the Government to reduce its dependence on borrowings from the domestic banking system. This, in turn, contributed to a reduction in the rate of inflation.

8. However, as Burma entered into the Fourth Four-Year Plan period in 1982/83, the previously optimistic outlook on the economy was altered by an abrupt deterioration in the country's balance of payments and financial accounts. The external current account deficit as a share of GDP, which had been relatively modest, widened from 4% in 1980/81 to 6.4% in 1981/82 and to 9.1% in 1982/83; the overall payments balance worsened from a surplus of US\$63 million in 1980/81 to a deficit of US\$158 million in 1982/83. The major factors accounting for this downturn were a combination of rising foreign exchange allocations for imports, a decline in export earnings, due largely to falling world market prices (especially for rice) and stagnating volumes, and a decline in receipts of official grants. While import volumes had been growing faster than export volumes since the mid-1970s, in order to support rapidly expanding public sector investments, the resource gap did not widen significantly until 1982/83.

9. The abrupt deterioration in the balance of payments was accompanied by an increase in the overall budget deficit, which rose from 9% of GDP in 1980/81 to 11% in 1982/83. To a certain extent, the balance of payments and budgetary developments were related, as about one quarter of the increase in the fiscal deficit was accounted for by the reduced profits on exports by Government trading monopolies. However, the basic cause was an inelastic tax system, inadequate public sector pricing policies, and rising capital outlays. Though a substantial part of the deficit was financed by foreign

loans and grants, borrowings from the domestic banking system also increased steadily.

10. Faced with a tight budgetary situation and a severe shortage of foreign exchange, the Government's immediate concern was stabilization. In 1983/84, imports had to be reduced sharply to prevent a further drawdown of reserves. Capital expenditures by the SEEs were curtailed through rephasing and consolidation of their investment programs. On the other hand, no new revenue initiatives were taken. As a result of these cutbacks and some improvement in export earnings, the external current account deficit was reduced to less than 4% of GDP and the overall fiscal deficit to 8.5% of GDP. Data for 1984/85 indicate that the current account deficit has been held to about 4.5% of GDP, but the overall fiscal deficit has risen to 12% of GDP because of a decline in the share of both tax revenues and the SEEs contribution to the budget relative to GDP; almost all this increase was financed by domestic bank borrowing. Notwithstanding these financial developments, increases in real output have continued at about 5-6% per annum. However, reflecting in part reduced allocations for imports, and heavy reliance on the banking system to finance budget deficits, inflation has begun to rise.

11. In the longer run, the Government's most important objective should be to achieve high real GDP growth while maintaining internal and external financial stability. New and wide-ranging initiatives need to be taken in the area of domestic resource mobilization, to enable the Government to maintain the level of public expenditures compatible with high growth without rapid increases in domestic bank credit. Moreover, if Burma is to sustain high GDP growth, the initiatives for stepping up domestic resource mobilization would need to be supported by equally ambitious undertakings to increase export earnings. Agricultural products now make up 80% of Burma's merchandise exports, with rice accounting for as much as 50% of total agricultural exports. Given this export concentration and some uncertainty about Burma's future rice export earnings, the Government's medium-to-longer term objective should be to generate larger exportable surpluses of commodities other than rice and teak, to help broaden the country's export base. Recognizing this, the Government has in recent years, shifted the focus of its agricultural strategy away from paddy to expanding the production of other crops. In the shorter term, however, the Burmese economy is expected to continue to rely heavily on rice and teak. Priority should be given to upgrading the quality of rice and improving the handling and distribution of teak, both for export.

12. Burma's debt service ratio (including IMF repurchases) increased from 35% in the 1980/81 to 45% in 1984/85, due primarily to a substantial increase in the latter part of 1970s in loans from private financial institutions and suppliers' credits. By March 1986, Burma's external public debt, disbursed and outstanding, was approximately US\$2.2 billion. The prospects for exports over the medium-term are not favorable. According to World Bank price projections, Burma's terms of trade will improve only gradually over the next five years. To contain the country's already high debt service burden, it is essential that, in addition to an aggressive export expansion, external assistance continue to be on concessionary terms.

13. Burma is potentially one of the richest countries in South Asia. Apart from an impressive natural resource base, it is endowed with a relatively healthy and literate population. The crucial issue is how well these

resources will be managed and developed. The Bank continues to discuss with the Government its external assistance requirements and measures for further improvements in economic management which would help Burma realize its promising potential for economic development. Discussions on these topics are carried on jointly with other donors and the IMF during the Burma Aid Group meetings which the World Bank has organized at the Government's request. The first meeting of the Group was held on November 30, 1976 in Tokyo; and there have been five subsequent meetings, with indications of increasing donor support each year. The last meeting was held on January 14, 1986 in Tokyo.

## PART II - WORLD BANK OPERATIONS

14. Burma became a member of IBRD in 1952, IFC in 1956, and IDA in 1962. Between 1956 and 1961, IBRD made three loans, totalling about US\$33 million, for the transport sector: one loan helped finance the Port of Rangoon's reconstruction of cargo berths and storage facilities and procurement of cargo-handling and port equipment, and two loans helped finance reconstruction and dieselization of the railways.

15. No lending was requested between 1962 and 1972. IDA lending resumed in 1973, and since then, 27 credits and three loans totalling about US\$693 million equivalent (net of cancellations) have been made. About 55% of this assistance has been for 16 projects in the agriculture sector: provision for irrigation pumps, two rubber rehabilitation projects, livestock development, two seed development projects, two paddyland development projects, grain storage, two forestry projects, two wood industries projects, the Kinda Dam multipurpose project, a tank irrigation project, and a groundwater irrigation project. About 19% of IDA assistance has supported rehabilitation of the transport sector through six projects, namely inland water transport, railways, two port projects, a road construction project and a timber distribution project. The remaining 26% of IDA assistance has been for two projects in the telecommunications sector (8%), one project in the mining sector (about 2%), a power project (12%), and a textile-finishing plant project (4%). Seven credits have been fully disbursed. Initially disbursements were slow, but performance has improved considerably as government agencies have become more familiar with IDA procedures. In general, IDA-financed projects have been carried out satisfactorily. Annex II contains a summary statement of IBRD Loans and IDA Credits as of March 31, 1986. IFC has made no investments in Burma.

16. In the past, lending was partly constrained by incomplete knowledge of some economic sectors and a lack of adequately prepared projects. Through ongoing projects and sector work, IDA has developed more detailed knowledge of many sectors. UNDP has provided about US\$10 million equivalent in technical assistance through three Umbrella Projects, for which IDA is the executing agency. This technical assistance has developed a project pipeline suitable for external financing in priority sectors, such as agriculture, transport, power, and industry. Several IDA-supported projects, namely seed development, rubber rehabilitation, power transmission, construction industry, third port, and groundwater irrigation, were prepared under these Umbrella Projects. Furthermore, IDA plans to continue its technical assistance on a project-by-project basis to help strengthen Burmese project preparation and implementation capabilities, as well as administrative and

managerial skills of Burmese personnel through in-service and overseas training.

17. IDA's country assistance strategy seeks to address Burma's immediate economic development constraints and has the following objectives: (a) to help improve foreign earnings by supporting economically viable export promotion and import substitution activities, improving production of export commodities, currently teak and rice, and developing other crops for export; (b) to help enhance Government's ability to mobilize domestic resources; and (c) to assist in modernizing and strengthening important institutions, especially in sectors in which IDA is involved.

18. Burma's expanding international economic links have contributed to a growing appreciation of the broader role that IDA can play in providing assistance to the development effort, and to an agreement in principle with the Government on the strategic objectives of IDA assistance. Accordingly, IDA would selectively support projects in those sectors where there has been a preparedness to engage in policy and institutional-building discussions and a demonstrated willingness to implement necessary reforms and address, increasingly, macroeconomic issues. On this basis, IDA would continue to support agricultural development and seek participation in new areas or sectors e.g., energy, industry, and human resources development.

19. IDA assistance to the agriculture sector would emphasize intensification of irrigated production on existing cropland and broadening of the country's export base through programs for diversified agricultural production. Assistance to the energy sector would focus on developing and exploiting more efficiently Burma's recently-discovered and existing gas and oil resources. Recent sector work on crop diversification and an energy assessment study may also provide the basis for initiating new long-term development strategies in these sectors, accompanied by policy and institutional strengthening. Possible future IDA projects under preparation include investments in groundwater and tank irrigation projects to expand crop diversification. Other projects include development of gas and power, industries, telecommunications and ports, with emphasis on rehabilitating and maximizing utilization of existing facilities. Studies are being undertaken to upgrade timber transport, improve navigation and flow of goods on the Irrawaddy and Chindwin Rivers, and to identify policy, operational and institutional weaknesses in selected industrial sub-sectors.

20. The World Bank currently accounts for about 15% of Burma's total external debt outstanding and about 1% of its debt service. In five years, the Bank Group's share in the total external debt is projected to rise to about 20% and its share in the debt service to about 2-3%.

### PART III - THE AGRICULTURE SECTOR

21. Agriculture, including forestry, livestock and fisheries, is the dominant sector of the Burmese economy. In 1985, it accounted for about 44% of GDP, 66% of the labor force and over 80% of exports. In addition, agricultural crops, particularly paddy, cotton, jute and sugarcane, support more than 60% of the country's industrial production.

22. Rice is Burma's major agricultural and export commodity, as well as a significant source of government revenue through implicit taxation from government-controlled pricing. Paddy is grown principally as a single, low-land rainfed crop in the monsoon period. About 5 M ha are sown to paddy annually, representing over 50% of the gross cultivated area. In 1984/85, rice accounted for more than one third of total agricultural output, and rice and rice products for 37% of the value of all merchandise exports. Other main crops include sesame, pulses, groundnuts, industrial crops such as jute and cotton and cereals other than paddy.

23. During the 1960s and early 1970s, value-added in agriculture rose at a modest rate of about 1.6% per annum, well below the prevailing 2.2% population growth. Among factors contributing to this unsatisfactory performance were changes in land policy, insufficient incentives to farmers and failures of imported high yielding paddy varieties (HYVs) which proved ill-suited to local conditions. The Government, in response to these developments, introduced a series of policy reforms beginning in 1973/74, to improve incentives to farmers and develop and promote HYVs suited to local conditions. As a result of these policies, value-added in agriculture and paddy production grew at average annual rates of 7.5% and 7.0%, respectively, between 1974/75 and 1984/85.

#### Expansion in Paddy Production

24. The dramatic growth of Burmese agriculture since the mid-1970s has been underpinned by a successful paddy intensification drive, the SHYP, launched in 1975/76. This program has combined improved availability of inputs and a greatly expanded and strengthened extension service with institutional support at the township level. While the spread of HYVs to cover 50% of the country's paddy area has been a manifestation of the "Green Revolution" which has also occurred elsewhere in Asia, local factors have contributed to making the Burmese process unique, e.g. participation of the People's Council in coordinating production and crop procurement, selectivity and concentration through a campaign-type approach, mobilization of the community to provide additional labor, and the provision of consumer goods on a priority basis to project areas to complement rising incomes. As a result, Burma has surpassed the average yields of most developing countries, and has reached about half the yield levels achieved in Japan. Total paddy production has grown from 9.4 M tons in 1977/78 to 14.4 M tons in 1984/85, an increase of over 50%.

#### Priorities for Agricultural Development

25. Intensification of production on existing irrigated land, diversification into non-paddy crops where technically and economically feasible, and upgrading of the quality of export rice have emerged as priority objectives in the Government's plan for agricultural development. Intensification can be achieved in a highly cost-effective manner in the large river diversion systems of the Dry Zone of Upper Burma, where major irrigation infrastructure built at the beginning of this century now requires substantial modernization and repair to bring an adequate and reliable supply of irrigation water to smallholders. Because of prevailing soil and climate conditions, the Government has also identified Upper Burma as the main target area for its agricultural diversification program covering 19 crops, especially oilseeds, pulses, coarse grains, and fiber crops. Since expanded

production of these diversified agricultural commodities will also require irrigation water to supplement available rainfall, the irrigation rehabilitation program being launched with the present project will inevitably play a major role in supporting diversification. In addition, the Government is attempting to intensify cropping in the wetter rice producing areas with short duration paddy varieties followed by other diversification crops.

### The Irrigation Subsector

26. Irrigation has so far played a limited role in Burma's agricultural development. Less than 3 M acres, or about 13% of the net cropped area, receives some form of irrigation, and double-cropping is restricted to about 0.4 million acres or 15% of the irrigated area. These ratios are among the lowest in Asia. Most of the existing public irrigation schemes were built at the beginning of this century on tributaries of the Irrawaddy to provide an assured water supply for a single main season rice crop. Government-run diversion systems account for about 915,000 acres (35% of the total) under irrigation, while private diversion schemes cover another 690,000 acres (26%). More recently, tanks and reservoirs covering 180,000 acres (7%), and various pumps and groundwater schemes spread over 865,000 acres (32%), many of them privately owned, have begun to play an increasingly important role in irrigation in Burma.

### Prospects for Irrigation

27. While the past role of irrigation has been limited, its potential for contributing to future increases in agricultural production is substantial. Because Burma's rainfall pattern is highly seasonal, cropping intensities will almost certainly remain low without irrigation. In Lower Burma, the cropping intensity currently reaches 130-140%, since cultivation on residual moisture sometimes follows a full main season paddy crop. However, in Upper Burma cropping intensity averages no more than 70-80%, since even during the monsoon season, rainfall is often inadequate for a full crop. Besides restricting crop areas, variable rainfall and poor water control also result in water stress on growing crops (especially in Upper Burma) and flooding (in Lower Burma), with as much as 10% of the sown area destroyed.

28. Since only a small fraction of the water flowing in Burma's rivers is currently tapped for irrigation, there is clearly a major scope for increased cropping during the dry season and for ensuring a full main season crop. This can be achieved through the construction of new storage and diversion structures, drainage and flood control facilities, and pumping schemes. In addition, Burma's existing irrigation infrastructure, especially the large systems constructed in Upper Burma 70-80 years ago, has suffered serious physical deterioration owing to long use and inadequate maintenance. Through a program of rehabilitation, coupled with appropriate operation and maintenance activities, the fuller potential of these existing irrigation systems can be realized.

### Government Agricultural Policy

29. The Government is increasingly recognizing that upgraded performance in irrigation requires not only technological development and provision of inputs, but also strengthening of public agencies and formulating policies conducive to producers' participation in agricultural development

initiatives. A number of major new programs have been launched or are under consideration. These include combined flood protection, land reclamation and pump irrigation programs in the Irrawaddy Delta; major storage-cum-irrigation projects on principal tributaries of the Irrawaddy, Sittang and Salween; tank projects on smaller tributaries and rivers; pump schemes; run-of-the-river diversion schemes; and groundwater projects.

#### Rationale for IDA Involvement

30. IDA's approach to development of irrigation in Burma has emphasized: (a) intensification of irrigated production on existing cropland; (b) introduction of diversified cropping on irrigated land in the Dry Zone; and (c) promotion of improved irrigation methods for groundwater pumping, tanks, multipurpose dams, and flood protection and drainage. In addition, the Bank has sought to strengthen the principal government institutions involved in irrigation and crop diversification, including the Irrigation Department (ID), responsible for the construction, operation and maintenance of irrigation facilities; the Agriculture Corporation (AC), responsible for research, extension, and input supply; and the Agricultural Mechanization Department. Given the increasingly important role these institutions will have to play in Burma's agricultural development, the Bank has recognized the need to help them build up their human, physical, and financial resources. Institution building, therefore, is a major focus of the proposed project.

31. While in recent years, Burma has allocated significant resources to new irrigation investments, it has also increasingly recognized the importance of rehabilitating deteriorated schemes and covering fully commanded areas. Given Burma's current financial resource constraints, rehabilitation is a highly attractive area of investment, since water distribution system limitations and flooding problems can be rapidly resolved using a known, low-cost technology, and farm production can continue uninterrupted during the construction period. Since IDA has been the leading source of financial assistance and policy advice to Burma in irrigation over the past decade, and has been the chief advocate of rehabilitation among external donors, it is particularly well-positioned to initiate this important rehabilitation program.

32. The proposed project, Burma's first major venture in irrigation rehabilitation, would inaugurate a program for rehabilitation over the next two decades that would eventually cover at least five large systems in the country's dry zone with a combined area of 500,000 acres. The Ye-U system has been selected for the first investment in rehabilitation because its infrastructure has become seriously deteriorated in recent years, thus requiring remedial measures more urgently than the other systems. While paddy would be the main crop grown in the Ye-U system, the remaining rehabilitation schemes would concentrate more heavily on diversified crops. IDA has evolved a close working relationship with ID, which has resulted in policy breakthrough in areas such as ICB practices, recovery of electricity costs in groundwater irrigation pumping, increased use of critically-required external consultants, and, to a limited extent, monitoring and evaluation of agricultural projects. Through the proposed project, IDA would continue to achieve significant reforms by building up ID's long-range planning and project preparation functions, and by creating an institutional capacity for managing efficiently ID's large and expanding fleet of costly heavy equipment and vehicles.

33. IDA Lending for Irrigation. The first project approved in 1973 (Cr. 483-BA, US\$17 M) financed some 13,000 low-lift pumps for sale to farmers, as well as rehabilitation of minor flood embankments in the delta area, equipment repair, and feasibility studies. Lessons from this project (Project Performance Audit Report dated June 14, 1982) include the following: (a) supervision concentrated on the project's engineering aspects, while agricultural development received inadequate attention; (b) despite marked differences in farm size, full account was not taken by authorities to safeguard the interests of small farmers; (c) the project provided for large centralized workshops, even though experienced mechanics could be found in all villages, leading to underutilization of project facilities; and (d) an adequate monitoring and evaluation system was not established. In designing the proposed project, due notice has been taken to remedy shortcomings of this nature.

34. The first project was followed by two Paddyland projects (Cr. 642-BA, US\$30 M, and Cr. 835-BA, US\$34.5 M), which are supporting flood protection works in the delta area, together with pump irrigation and agricultural extension activities.<sup>1/</sup> In 1980, IDA financed a multipurpose hydropower and irrigation project on the Paunglaung River in Central Burma (Nyaunggyat Dam, now renamed Kinda Dam, Cr. 1031-BA, US\$90 M). The most recently approved irrigation projects include two tank irrigation schemes (Cr. 1315-BA, US\$19.0 M) and a groundwater project (Cr. 1381-BA, US\$14.0 M). Prospective projects include an area development and pump irrigation project (Henzada) for which a UNDP-financed feasibility study has been completed, and repeater groundwater and tank irrigation projects. In related areas, IDA has help financed two grain storage projects (Cr. 1092-BA and Cr. 1707-BA ) to help overcome post-harvest constraints upon grain procurement and handling, and two seeds development projects (Cr. 745-BA and Cr. 1616-BA) aimed at meeting the growing demand for quality HYV seeds.

35. The IDA's experience in the irrigation subsector has been generally positive. Paddyland, Tank Irrigation, and Groundwater Projects experienced initial delays due to shortages of cement, diesel fuel and reinforced steel, and slow progress in procurement and appointment of consultants. Progress on the large-scale Kinda project has been good, with dam construction (43% of project costs) ahead of schedule. As the Government has now acquired considerable experience in following IDA guidelines for procurement and consultants, and several large infrastructure projects are currently nearing completion (including Kinda), it is expected that these earlier delays will be mitigated in future projects.

#### PART IV - THE PROJECT

36. The proposed project was prepared by FAO/CP and appraised by a mission which visited Burma in November 1984. A Staff Appraisal Report entitled "Burma: Ye-U Irrigation Rehabilitation and Modernization Project" (Report No. 5524-BA dated July 14, 1986), is being distributed separately

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<sup>1/</sup> Paddyland I Project was closed on June 30, 1985.

to the Executive Directors. A timetable of key events relating to the project and special conditions is given in Annex III. Negotiations were held in Washington, D.C. from June 2 - 6, 1986. The Burmese delegation was led by His Excellency Brigadier General U Than Nyunt, Minister of Agriculture and Forests.

### Project Area

37. The project area, situated in the central part of Sagaing Division in Upper Burma (IBRD Map No. 18409), is the Ye-U command area of the Mu-Kabo irrigation system. It is located on the right bank of the river Mu, an important tributary of the Irrawaddy River which it joins to the south in its swing to the west below Mandalay. The project area covers part of three townships: Ye-U, Tabayin, and Ayadaw.

### Project Objectives

38. The main objectives of the project are:

- (a) to raise the incomes and improve the living standards of farmers located within the Ye-U command area, by enhancing water delivery through rehabilitation and modernization of the irrigation infrastructure and improvements to the Agriculture Corporation's (AC) extension and input supply services; and
- (b) to strengthen the ID's overall capacity to plan and carry out the modernization, rehabilitation and maintenance of Burma's irrigation infrastructure, through the elaboration of a Master Plan for the rehabilitation of at least five major schemes;
- (c) to create within the ID's Mechanical Branch the capacity for full and effective management of ID's fleet of earthmoving equipment, and to undertake the overhaul of a portion of the fleet, for use in implementing the Master Plan and other irrigation projects.

### Project Components

39. The proposed project, to be implemented over a six-year period, would comprise the following components:

#### A. Irrigation Civil Works

1. Rehabilitation: Repairs to the Ye-U intake structure, bifurcation structure, cross-drainage and crop structure, head regulators, and traffic and foot bridges; and excavation and resectioning of major, distributary, and minor canals, and of cross drains, feeder drains, and the Payanpaga and Moksi Chaungs.
2. System Modernization: Construction of a sediment ejector and silt trap, cross regulators, and outlets at the heads of minor canals and watercourses; provision of side and tail escapes in the main canals; installation of measuring devices at branch canal heads and at distributary intakes; construction of inspection roads and tracks; and provision of telephone communications for operation of the Ye-U system.

3. Incremental O&M: Increased outlays for operation maintenance of the Ye-U system, in order to ensure adequate maintenance of irrigation infrastructure.
  4. On-Farm Development: Remodelling and realignment of watercourses.
- B. Earthmoving Equipment: Provision of 17 items of major new equipment and 51 items of minor construction equipment plus spare parts, for work at Ye-U.
- C. Construction Supervision
1. Construction Camps. Construction of offices, dormitories, godowns, and equipment repair facilities in preparation for undertaking the irrigation civil works.
  2. Engineering and Administration: Provision of office and engineering equipment, plus overhead running expenses, vehicles, and about 500 personnel of the Irrigation Department to be redeployed from other projects.
- D. Institutional Strengthening and Technical Assistance
1. ID (Civil Engineering): Provision of technical assistance counterpart staff, and vehicles, and facilities for preparation of a long-term master plan for irrigation rehabilitation and preparing a second follow-on project; provision of technical assistance, counterpart staff, equipment, model studies and technical assistance for design and testing of the silt trap and improved Ye-U system operation, based on new operational guidelines.
  2. ID (Mechanical Engineering): Provision of technical assistance counterpart staff, and facilities for establishing a national equipment management plan; and provision of fellowships for training in equipment management, machine overhaul, specialized repair of heavy equipment, and scrapping of old equipment.
  3. Agriculture Corporation (AC): Provision of about 60 additional extension personnel, plus vehicle and fertilizer godowns for three townships affected by the project; and provision of fellowships in rice agronomy, cropping systems, and water management
- E. Mechanical Circle Workshops
1. Mechanical Circle Services: Provision of fuel and lubricant services, and tools and materials for base and regional workshops and engine overhaul shops; upgrading of a hydraulic component workshop; and construction of a dredger base at Okkyin.
  2. Workshop Spare Parts: Provision of spare parts for overhaul of existing heavy equipment, to be used in future irrigation projects.

- F. Monitoring and Evaluation: Provision of staff support, office supplies, and computer software of AC for the execution of benchmark, mid-term, and final surveys.

### Project Organization

40. A Project Coordination Committee (PCC) would be formed in the Ministry of Agriculture and Forests (MAF), similar to such committees for other IDA assisted irrigation projects, chaired by the Deputy Minister of MAF and composed of heads of implementing and related supporting agencies. The Committee would be responsible for: (a) reviewing annual work programs, budgets, and quarterly progress reports; (b) establishing project-related policies and solving interministerial problems; and (c) conferring with IDA on project-related matters.

41. The Irrigation Department (ID), under the Ministry of Agriculture and Forests, is the lead agency for projects involving drainage, flood control and irrigation. ID would be responsible for overall project implementation. A Project Director would be appointed by October 31, 1986 and would head the Project Unit, comprising senior technical officers of ID and the Agriculture Corporation (AC), the two key implementing agencies. The Project Director would also serve as secretary of the PCC. The Deputy Director (Mechanical) of ID, in close coordination with the Project Director, would oversee the work of the Fleet Management Division in reallocating, overhauling, scrapping and purchasing equipment and spare parts. This division, under an Executive Engineer, would also be responsible for upgraded workshops facilities and on-the-job training of ID mechanics. In addition, the Deputy Director (Mechanical), through the Mechanical Circle for Upper Burma, would assist the Project Director and the Construction Division of Ye-U in maintaining the equipment and vehicles needed at the site and in providing operators for this machinery.

42. The Agriculture Corporation within MAF is responsible for agricultural extension and research, coordination of fertilizer and agricultural chemical distribution, and seed multiplication and distribution. AC's Extension Division has responsibility for implementing agricultural production plans, procuring and distributing agricultural supplies, and disseminating research information to farmers. AC would extend its Special High Yielding Program to cover the project area by September 30, 1987, and a Project Extension Manager would be appointed to coordinate AC extension activities.

43. The project's technical assistance and training, to be financed by United Nations Development Programme (UNDP) (para. 45), would be executed in two separate parts. For the specialized technical assistance required to (a) design and test a silt excluder, (b) design the main and branch canals, and (c) develop improved methods for operation of the Ye-U system, the Government would either select a qualified executing agency (excluding the World Bank) or execute these activities itself. For the remaining technical assistance required for (a) elaboration of a long-term Master Plan for irrigation rehabilitation and (b) strengthening of ID's Mechanical Branch, the World Bank would serve as executing agency, as requested by the Government.

### Cost Estimates

44. The project is estimated to cost about US\$26.1 M equivalent, including duties and taxes of US\$1.8 M equivalent and price contingencies of US\$4.9 M equivalent. The foreign exchange costs would be about US\$11.0 M equivalent or 42% of total costs. These costs are based on prices prevailing at the time of appraisal, adjusted to mid-1986 levels. Physical contingencies, estimated for each cost item, would amount to an average of 15% of civil works and 10% of equipment costs. Price contingencies for foreign currency costs are estimated on the basis of annual inflation rates of 6.8% in 1987-88, 7% in 1989 and 7.1% in 1990-92. Price contingencies for local currency costs are estimated on the basis of annual inflation rates of 8% in 1987-89 and 5% in 1990-92.

### Financing Plan

45. The proposed IDA credit of US\$14.0 M would finance about 54% of total costs, including the full foreign exchange costs of US\$9.2 M (excluding TA of US\$1.8 M) and local costs of US\$4.8 M (net of duties and taxes). The Government would finance about US\$10.3 M equivalent, including taxes and duties. The Government and the UNDP have agreed that UNDP would provide grant-financing for the full foreign exchange costs of technical assistance, training, and monitoring and evaluation of the project, amounting to about US\$1.8 M. Local costs associated with this technical assistance and training (US\$0.1 M equivalent) would be financed by the Government. The signing of a project agreement between the Government and UNDP covering both parts of the technical assistance would be a condition of effectiveness of the IDA Credit.

### Procurement

46. Project civil works (US\$9.2 M equivalent) would not be suitable for international competitive bidding (ICB). The civil works comprise a large number of small, technically-simple, scattered works: earthwork, minor repairs to existing structures, construction of small structures and buildings. Construction would also be subject to seasonal weather interruptions and would have to be phased so as to minimize disruption of the irrigation system operation. These works are, therefore, unlikely to be of interest to foreign contractors. Since no private contracting industry exists in Burma, ID would carry out the work by force account. This arrangement has worked well for the Irrigation I Project (Credit 483-BA), and the Paddyland I Project (Credit 642-BA) and is currently used for civil works in the Paddyland II Project (Credit 835-BA).

47. Equipment, vehicles, and spare parts (US\$11.1 M equivalent), with an estimated foreign cost of about US\$8.7 M equivalent, would be procured through ICB in accordance with Bank's Procurement Guidelines. A preference to domestic manufacturers limited to 15% of the CIF price or the prevailing custom duty, whichever is lower, would be extended to goods manufactured locally in the evaluation of bids. Equipment, spare parts, and materials and groupings thereof, estimated to cost the equivalent of less than US\$25,000, may be purchased through international shopping and on the basis of comparing prices from no less than three independent suppliers. Such purchases would be limited to a maximum of US\$0.5 M. Procurement arrangements are summarized in the table below:

<u>Component</u>	<u>Procurement Method</u> (in US Dollars Millions)			<u>Total Cost</u>
	<u>ICB</u>	<u>LCB</u>	<u>Other</u>	
1. Civil Works	-	-	9.25 (4.62)	9.25 (4.62)
2. Equipment and Vehicles	11.14 (9.38)	-	-	11.14 (9.38)
3. Technical Assistance and Training	-	-	1.71 (-)	1.71 (-)
4. Recurrent Costs	-	-	4.04 (-)	4.04 (-)
<b>Total</b>	<b>11.14</b> <b>(9.38)</b>		<b>15.00</b> <b>(4.62)</b>	<b>26.14</b> <b>(14.00)</b>

Note: Figures in parentheses are the respective amounts to be financed by IDA.

Disbursements

48. Disbursements from the IDA credit would cover the indicated percentage of total expenditures for each item, excluding taxes and duties:

(a) Civil works: 50%

(b) Equipment, spare parts and construction materials:

(i) Directly imported - 100% of the foreign expenditures,

(ii) Locally manufactured, procured under ICB - 100% of local expenditures (ex-factory cost),

(iii) Off-the-shelf procurement - 70% of total expenditures.

Disbursements for civil works that are carried out by force account would be made against statements of expenditure, the detailed documentation for which would be retained by ID for review by IDA. All other disbursements would be fully documented.

Operation and Maintenance (O&M)

49. Over the past five years, ID has provided annually about K 2.0 M for the system maintenance element of the O&M budget for Ye-U, or K 20/acre (based on the net commanded area of 101,000 acres). Since these funds have been insufficient, the project would provide for incremental O&M in order to bring the total for maintenance of civil works to about K 32/acre or K 3.9 M a year for the net area of 121,000 acres under rehabilitation. In addition, items involving recurring expenditure, including salaries, maintenance and repairs, would also be maintained in the future, at least at their current levels in real terms. Thus, total O&M expenditure for the Ye-U system would rise to about K 7.4 million (K 61/acre) a year. The Government would provide

sufficient funds to meet the revised O&M needs of the Ye-U irrigation system, and to that end, would (a) review annually with IDA the allocated budget for O&M costs, including incremental costs to be financed under the project; and (b) based on this annual review, make suitable adjustments to such budgetary allocations.

### Cost Recovery

50. Among the countries of South Asia, Burma presents a unique case in irrigation cost recovery. Through a system of official crop procurement prices, especially for paddy and cotton, the Government recovers not only the cost of O&M, but also a significant portion of capital costs, even though crop procurement is used to raise general revenues, rather than specifically to meet the public costs associated with irrigation. The other major category of cost to the Government in irrigation—subsidies on fertilizer—is also partially recovered through procurement taxation. This indirect form of agricultural taxation typically accounts for over 95% of government revenues from public irrigation schemes, thus overshadowing other forms of direct taxation such as water charges and land taxes.

51. It is expected that the government would recover about 95% of capital costs and costs of incremental O&M and input subsidies over the 30-year life of the investment. In present value terms, these incremental costs include investment cost (57%), fertilizer subsidy (35%) and O&M (8%). The major source of recovery would be the Government's indirect taxation of crops procured at official prices. In respect to this project, the government, under arrangements satisfactory to IDA, would make direct or indirect recovery of O&M costs, and to that end, would (a) review periodically cost recovery performance and furnish its findings to IDA; and (b) in the event that the existing procurement system is significantly modified or abolished, establish and maintain alternative and adequate arrangements, in consultation with IDA, with respect to the recovery of O&M costs of the project.

### Project Benefits and Justification

52. Provision of a fuller, more reliable supply of irrigation water to a larger number of farmers in the Ye-U command area, combined with improved water management and strengthened extension and input services, would result in an increased cropped area, higher yields, and an expansion of overall production. At full production starting in the ninth year of the project, the annual incremental output would amount to about 46,000 tons of paddy and 1,000 tons of pulses.

53. At full development, the project is expected to generate an additional 1.4 million days (4,750 years) of on-farm employment for families in the Ye-U area. During the six-year implementation period of the project, construction activities would also provide employment for about 500 incremental staff of the ID, and the hiring of approximately 2 million days (about 3,270 persons annually for five years) of unskilled labor to carry out civil works. This additional employment, absorbing non-wage household labor, would help solve chronic dry-season unemployment in the area and reduce the flow of seasonal migrants from Ye-U to the towns and to the tea-growing Shan State.

54. The institutional strengthening and technical assistance provided would enable the country to undertake long-term irrigation rehabilitation

planning, prepare prefeasibility studies, and manage ID's heavy equipment fleet more efficiently. Complementing a program for repairing used equipment, this enhanced institutional capacity would achieve considerable overall savings and a reduction in foreign exchange outlays for capital costs of future irrigation development. At the national level, enhanced agricultural output in Ye-U would lead to an increase in export earnings and an improvement in Burma's balance of payments position. Over the 30-year period, the present values of foreign exchange benefits and costs due to the project are estimated to be about US\$32.5 million and US\$17.3 million, respectively, implying a lifetime net foreign exchange benefit of about US\$15.0 million.

55. Economic Rate of Return. The benefits to be derived from the rehabilitation of the Ye-U system have been compared with the total investment costs of the project, minus the workshop components (i.e., institutional strengthening of ID Mechanical Branch services, and spare parts for equipment overhaul) which would have no direct bearing on production in Ye-U. On this basis, the Burmese economy would be expected to earn an overall rate of return of 20.2%; at the opportunity cost of capital to Burma of 12%, the net present value of the project investment would be about K 55.9 million (US\$6.4 million). The relevant switching values suggest that the project ERR is fairly robust: costs would have to increase by 26%, or benefits would have to decline by 21%, in order to reduce the estimated ERR to the 12% level of the opportunity cost of capital. The sensitivity tests also indicate that the project's economic viability is insensitive to increases in construction, O&M and on-farm production costs. A one-year delay in realizing project benefits without delaying the investment cost stream would also result in an acceptable ERR. Furthermore, the project would remain viable even if the economic price of rice were to fall by 20% below the projections used in the base rate, which are already well below historical rice price levels.

#### Environmental Impact

56. Since the project would essentially rehabilitate and modernize the existing irrigation system, no adverse environmental impact is expected. By improving drainage and removing flood waters from a part of the command area, the project would help reduce the incidence of waterborne diseases.

#### Project Risks

57. Since the engineering works to be carried out at Ye-U are relatively simple, and ID has already demonstrated its ability to execute such works in other irrigation projects, neither institutional nor any serious technical risks are anticipated. A possible impediment would be the current shortages of diesel fuel, cement and reinforced steel, because of large requirements for these items for the Kinda project. However, these shortages should be alleviated by the completion of major works under the Kinda Dam Project in 1986/87. Cement availability would improve with the recent completion of a new cement plant. There is also a possible risk that ID Mechanical Branch may face difficulties in developing the modern technical and managerial skills required to meet its expanded role under the project. In order to minimize such a risk, technical assistance would be provided, especially during the first years of implementation.

PART V - RECOMMENDATION

58. I am satisfied that the proposed Credit would comply with the Articles of Agreement of the Association and recommend that the Executive Directors approve the proposed Credit.

Barber B. Conable  
President

Attachments

Washington, D.C.  
August 7, 1986

TABLE 3A

BURMA	- SOCIAL INDICATORS DATA SHEET				
	BURMA			REFERENCE GROUPS (WEIGHTED AVERAGES) /a	
	1960/b	1970/b	MOST RECENT ESTIMATE/b	LOW INCOME ASIA & PACIFIC	MIDDLE INCOME ASIA & PACIFIC
AREA (THOUSAND SQ. KM)					
TOTAL	676.6	676.6	676.6	.	.
AGRICULTURAL	106.0	106.0	106.4	.	.
GDP PER CAPITA (US\$)	..	..	180.0	278.3	1011.1
ENERGY CONSUMPTION PER CAPITA (KILOGRAMS OF OIL EQUIVALENT)	41.0	50.0	59.0	785.7	566.8
POPULATION AND VITAL STATISTICS					
POPULATION, MID-YEAR (THOUSANDS)	21780.0	27137.0	33492.0	.	.
URBAN POPULATION (% OF TOTAL)	19.3	22.8	28.9	22.3	35.9
POPULATION PROJECTIONS					
POPULATION IN YEAR 2000 (MILL)			33.0	.	.
STATIONARY POPULATION (MILL)			115.0	.	.
POPULATION MOMENTUM			1.9	.	.
POPULATION DENSITY					
PER SQ. KM.	32.2	40.1	52.3	173.8	386.9
PER SQ. KM. AGRI. LAND	209.6	251.2	332.2	353.3	1591.2
POPULATION AGE STRUCTURE (%)					
0-14 YRS	38.2	40.3	41.2	36.3	38.2
15-64 YRS	59.1	56.3	54.9	59.4	57.7
65 AND ABOVE	2.6	3.3	3.7	4.3	3.5
POPULATION GROWTH RATE (%)					
TOTAL	1.9	2.2	2.1	2.0	2.3
URBAN	3.7	3.9	3.9	4.1	4.1
CRUDE BIRTH RATE (PER THOUS)	42.9	40.1	37.6	27.5	30.1
CRUDE DEATH RATE (PER THOUS)	21.0	16.8	12.3	10.2	9.4
GROSS REPRODUCTION RATE	2.8	2.8	2.6	1.7	1.9
FAMILY PLANNING					
ACCEPTORS, ANNUAL (THOUS)	..	..	..	.	.
USERS (% OF MARRIED WOMEN)	..	..	3.0 /c	49.4	56.5
FOOD AND NUTRITION					
INDEX OF FOOD PROD. PER CAPITA (1969-71=100)	100.0	101.0	111.0	116.6	124.4
PER CAPITA SUPPLY OF					
CALORIES (% OF REQUIREMENTS)	86.0	96.0	122.0	106.3	115.7
PROTEINS (GRAMS PER DAY)	47.0	54.0	73.0	60.1	60.3
OF WHICH ANIMAL AND PULSE	11.0	12.0	12.0 /d	14.4	14.1
CHILD (AGES 1-4) DEATH RATE	23.8	18.2	11.0	7.3	7.2
HEALTH					
LIFE EXPECT. AT BIRTH (YEARS)	43.8	48.8	54.9	60.5	60.6
INFANT MORT. RATE (PER THOUS)	158.0	128.0	93.0	69.2	64.9
ACCESS TO SAFE WATER (%POP)					
TOTAL	..	18.0	21.0 /c	44.2	46.0
URBAN	..	35.0	34.0 /c	77.2	57.6
RURAL	..	13.0	15.0 /c	34.6	37.1
ACCESS TO EXCRETA DISPOSAL (% OF POPULATION)					
TOTAL	..	35.0	21.0 /c	7.8	50.1
URBAN	..	45.0	38.0 /c	28.8	52.9
RURAL	..	32.0	15.0 /c	5.5	44.7
POPULATION PER PHYSICIAN	15560.0	8830.0	4680.0 /e	3318.0	7751.7
POP. PER NURSING PERSON	8520.0 /f	7410.0	4770.0 /e	4690.7	2464.8
POP. PER HOSPITAL BED					
TOTAL	1520.0	1180.0	1100.0 /d	1039.2	1112.1
URBAN	330.0 /f	350.0	379.0 /d	299.1	651.4
RURAL	..	15300.0	7160.0 /d	6028.2	2596.9
ADMISSIONS PER HOSPITAL BED	..	34.0	..	52.3	41.1
HOUSING					
AVERAGE SIZE OF HOUSEHOLD					
TOTAL	4.4	..	..	..	..
URBAN	..	..	..	..	..
RURAL	..	..	..	..	..
AVERAGE NO. OF PERSONS/ROOM					
TOTAL	..	..	..	..	..
URBAN	..	..	..	..	..
RURAL	..	..	..	..	..
PERCENTAGE OF DWELLINGS WITH ELECT.					
TOTAL	..	..	..	..	..
URBAN	..	..	..	..	..
RURAL	..	..	..	..	..

TABLE 3A

BURMA	- SOCIAL INDICATORS DATA SHEET				
	1960/ <sup>b</sup>	1970/ <sup>b</sup>	MOST RECENT ESTIMATE/ <sup>b</sup>	REFERENCE GROUPS (WEIGHTED AVERAGES) / <sup>a</sup> (MOST RECENT ESTIMATE) / <sup>b</sup>	
				LOW INCOME ASIA & PACIFIC	MIDDLE INCOME ASIA & PACIFIC
<b>EDUCATION</b>					
ADJUSTED ENROLLMENT RATIOS					
PRIMARY: TOTAL	36.0	87.0	84.0 / <sup>g</sup>	92.6	100.7
MALE	61.0	92.0	87.0 / <sup>g</sup>	105.3	104.4
FEMALE	52.0	83.0	81.0 / <sup>g</sup>	79.3	97.2
SECONDARY: TOTAL	10.0	21.0	20.0 / <sup>d</sup>	31.3	47.8
MALE	13.0	26.0	22.0 / <sup>d</sup>	40.8	50.6
FEMALE	7.0	17.0	18.0 / <sup>d</sup>	21.9	44.8
VOCATIONAL (% OF SECONDARY)	0.5	0.8	1.4 / <sup>e</sup>	3.2	18.4
PUPIL-TEACHER RATIO					
PRIMARY	42.0	47.0	48.0 / <sup>e</sup>	38.0	30.4
SECONDARY	40.0	32.0	31.0 / <sup>e</sup>	17.4	22.2
<b>CONSUMPTION</b>					
PASSENGER CARS/THOUSAND POP	0.8	1.1	1.2 / <sup>g</sup>	0.9	10.1
RADIO RECEIVERS/THOUSAND POP	5.3	14.7	23.1	129.8	172.9
TV RECEIVERS/THOUSAND POP	..	..	0.1	19.8	58.5
NEWSPAPER ("DAILY GENERAL INTEREST") CIRCULATION PER THOUSAND POPULATION	11.3	15.3	14.4	25.7	63.3
CINEMA ANNUAL ATTENDANCE/CAPITA	6.0 / <sup>h</sup>	7.8 / <sup>i</sup>	..	6.0	3.4
<b>LABOR FORCE</b>					
TOTAL LABOR FORCE (THOUS)	10404.0	11635.0	14066.0	..	..
FEMALE (PERCENT)	40.1	36.9	35.4	33.2	33.6
AGRICULTURE (PERCENT)	..	69.9	67.1 / <sup>c</sup>	69.6	52.2
INDUSTRY (PERCENT)	..	8.0	9.8 / <sup>c</sup>	15.8	17.9
PARTICIPATION RATE (PERCENT)					
TOTAL	47.8	42.9	39.6	41.9	38.9
MALE	58.0	54.7	51.3	53.6	50.8
FEMALE	37.8	31.3	28.1	29.1	26.6
ECONOMIC DEPENDENCY RATIO	0.9	1.0	1.1	1.0	1.1
<b>INCOME DISTRIBUTION</b>					
PERCENT OF PRIVATE INCOME RECEIVED BY					
HIGHEST 5% OF HOUSEHOLDS	14.6 / <sup>i</sup>	..	..	..	..
HIGHEST 20% OF HOUSEHOLDS	44.7 / <sup>i</sup>	40.0 / <sup>i</sup>	..	..	48.0
LOWEST 20% OF HOUSEHOLDS	6.5 / <sup>i</sup>	8.0 / <sup>i</sup>	..	..	6.4
LOWEST 40% OF HOUSEHOLDS	16.5 / <sup>i</sup>	21.0 / <sup>i</sup>	..	..	15.5
<b>POVERTY TARGET GROUPS</b>					
ESTIMATED ABSOLUTE POVERTY INCOME LEVEL (US\$ PER CAPITA)					
URBAN	..	..	94.0 / <sup>d</sup>	133.9	..
RURAL	..	..	68.0 / <sup>d</sup>	111.6	151.9
ESTIMATED RELATIVE POVERTY INCOME LEVEL (US\$ PER CAPITA)					
URBAN	..	..	30.0 / <sup>d</sup>	..	177.9
RURAL	..	..	36.0 / <sup>d</sup>	61.7	164.7
ESTIMATED POP. BELOW ABSOLUTE POVERTY INCOME LEVEL: (%)					
URBAN	..	..	40.0 / <sup>g</sup>	43.8	23.5
RURAL	..	..	40.0 / <sup>g</sup>	51.7	37.8

.. NOT AVAILABLE  
 . NOT APPLICABLE

## NOTES

- /a The group averages for each indicator are population-weighted arithmetic means. Coverage of countries among the indicators depends on availability of data and is not uniform.
- /b Unless otherwise noted, "Data for 1960" refer to any year between 1959 and 1961; "Data for 1970" between 1969 and 1971; and data for "Most Recent Estimate" between 1981 and 1983.
- /c 1980; /d 1977; /e 1979; /f 1962; /g 1978; /h 1964; /i 1972; /j 1958, Rangoon only.

## DEFINITIONS OF SOCIAL INDICATORS

Notes: Although the data are drawn from sources generally judged the most authoritative and reliable, it should also be noted that they may not be internationally comparable because of the lack of standardized definitions and concepts used by different countries in collecting the data. The data are, nonetheless, useful to describe orders of magnitude, indicate trends, and characterize certain major differences between countries.

The reference groups are (1) the same country group of the subject country and (2) a country group with somewhat higher average income than the country group of the subject country (except for "High Income Oil Exporters" group where "Middle Income North Africa and Middle East" is chosen because of stronger multi-cultural affinities). In the reference group data the averages are population weighted arithmetic means for each indicator and shown only when majority of the countries in a group has data for that indicator. Since the coverage of countries among the indicators depends on the availability of data and is not uniform, caution must be exercised in relating averages of one indicator to another. These averages are only useful in comparing the value of one indicator at a time among the country and reference groups.

**AREA** (thousand sq.km.)

**Total**—Total surface area comprising land area and inland waters; 1960, 1970 and 1983 data.

**Agricultural**—Estimate of agricultural area used temporarily or permanently for crops, pastures, market and kitchen gardens or to lie fallow; 1960, 1970 and 1982 data.

**GNP PER CAPITA (US\$)**—GNP per capita estimates at current market prices, calculated by same conversion method as *World Bank Atlas* (1981-83 basis); 1983 data.

**ENERGY CONSUMPTION PER CAPITA**—Annual apparent consumption of commercial primary energy (coal and lignite, petroleum, natural gas and hydro, nuclear and geothermal electricity) in kilograms of oil equivalent per capita; 1960, 1970, and 1982 data.

**POPULATION AND VITAL STATISTICS**

**Total Population, Mid-Year (thousands)**—As of July 1, 1960, 1970, and 1983 data.

**Urban Population (percent of total)**—Ratio of urban to total population; different definitions of urban areas may affect comparability of data among countries; 1960, 1970, and 1983 data.

**Population Projections**

**Population in year 2000**—The projection of population for 2000, made for each economy separately. Starting with information on total population by age and sex, fertility rates, mortality rates, and international migration in the base year 1980, these parameters were projected at five-year intervals on the basis of generalized assumptions until the population became stationary.

**Stationary population**—Is one in which age- and sex-specific mortality rates have not changed over a long period, while age-specific fertility rates have simultaneously remained at replacement level (net reproduction rate = 1). In such a population, the birth rate is constant and equal to the death rate, the age structure is also constant, and the growth rate is zero. The stationary population size was estimated on the basis of the projected characteristics of the population in the year 2000, and the rate of decline of fertility rate to replacement level.

**Population Momentum**—Is the tendency for population growth to continue beyond the time that replacement-level fertility has been achieved; that is, even after the net reproduction rate has reached unity. The momentum of a population in the year  $t$  is measured as a ratio of the ultimate stationary population to the population in the year  $t$ , given the assumption that fertility remains at replacement level from year  $t$  onward; 1985 data.

**Population Density**

**Per sq.km.**—Mid-year population per square kilometer (100 hectares) of total area; 1960, 1970, and 1983 data.

**Per sq.km. agricultural land**—Computed as above for agricultural land only; 1960, 1970, and 1982 data.

**Population Age Structure (percent)**—Children (0-14 years), working age (15-64 years), and retired (65 years and over) as percentage of mid-year population; 1960, 1970, and 1983 data.

**Population Growth Rate (percent)—Total**—Annual growth rates of total mid-year population for 1950-60, 1960-70, and 1970-83.

**Population Growth Rate (percent)—urban**—Annual growth rates of urban population for 1950-60, 1960-70, and 1970-83 data.

**Crude Birth Rate (per thousand)**—Number of live births in the year per thousand of mid-year population; 1960, 1970 and 1983 data.

**Crude Death Rate (per thousand)**—Number of deaths in the year per thousand of mid-year population; 1960, 1970, and 1983 data.

**Gross Reproduction Rate**—Average number of daughters a woman will bear in her normal reproductive period if she experiences present age-specific fertility rates, usually five-year averages ending in 1960, 1970, and 1983.

**Family Planning—Acceptors, Annual (thousands)**—Annual number of acceptors of birth control devices under auspices of national family planning program.

**Family Planning—Users (percent of married women)**—The percentage of married women of child-bearing age who are practicing or whose husbands are practicing any form of contraception. Women of child-bearing age are generally women aged 15-49, although for some countries contraceptive usage is measured for other age groups.

**FOOD AND NUTRITION**

**Index of Food Production Per Capita (1969-71 = 100)**—Index of per capita annual production of all food commodities. Production excludes animal feed and seed for agriculture. Food commodities include primary commodities (e.g. sugarcane instead of sugar) which are edible and contain nutrients (e.g. coffee and tea are excluded); they comprise cereals, root crops, pulses, oil seeds, vegetables, fruits, nuts, sugarcane and sugar beets, livestock, and livestock products. Aggregate production of each country is based on national average producer price weights, 1961-65, 1970, and 1982 data.

**Per Capita Supply of Calories (percent of requirements)**—Computed from calorie equivalent of net food supplies available in country per capita per day. Available supplies comprise domestic production, imports less exports, and changes in stock. Net supplies exclude animal feed, seeds for use in agriculture, quantities used in food processing, and losses in distribution. Requirements were estimated by FAO based on physiological needs for normal activity and health considering environmental temperature, body weights, age and sex distribution of population, and allowing 10 percent for waste at household level; 1961, 1970 and 1982 data.

**Per Capita Supply of Protein (grams per day)**—Protein content of per capita net supply of food per day. Net supply of food is defined as above. Requirements for all countries established by USDA provide for minimum allowances of 60 grams of total protein per day and 20 grams of animal and pulse protein, of which 10 grams should be animal protein. These standards are lower than those of 75 grams of total protein and 23 grams of animal protein as an average for the world, proposed by FAO in the Third World Food Supply; 1961, 1970 and 1982 data.

**Per Capita Protein Supply From Animal and Pulse**—Protein supply of food derived from animals and pulses in grams per day; 1961-65, 1970 and 1977 data.

**Child (ages 1-4) Death Rate (per thousand)**—Number of deaths of children aged 1-4 years per thousand children in the same age group in a given year. For most developing countries data derived from life tables; 1960, 1970 and 1983 data.

**HEALTH**

**Life Expectancy at Birth (years)**—Number of years a newborn infant would live if prevailing patterns of mortality for all people

at the time of its birth were to stay the same throughout its life; 1960, 1970 and 1983 data.

**Infant Mortality Rate (per thousand)**—Number of infants who die before reaching one year of age per thousand live births in a given year; 1960, 1970 and 1983 data.

**Access to Safe Water (percent of population)—total, urban, and rural**—Number of people (total, urban, and rural) with reasonable access to safe water supply (includes treated surface waters or untreated but uncontaminated water such as that from protected boreholes, springs and sanitary wells) as percentages of their respective populations. In an urban area a public fountain or standpost located not more than 200 meters from a house may be considered as being within reasonable access of that house. In rural areas reasonable access would imply that the housewife or members of the household do not have to spend a disproportionate part of the day in fetching the family's water needs.

**Access to Excreta Disposal (percent of population)—total, urban, and rural**—Number of people (total, urban, and rural) served by excreta disposal as percentages of their respective populations. Excreta disposal may include the collection and disposal, with or without treatment, of human excreta and waste-water by water-borne systems or the use of pit privies and similar installations.

**Population per Physician**—Population divided by number of practicing physicians qualified from a medical school at university level.

**Population per Nursing Person**—Population divided by number of practicing male and female graduate nurses, assistant nurses, practical nurses and nursing auxiliaries.

**Population per Hospital Bed—total, urban, and rural**—Population (total, urban, and rural) divided by their respective number of hospital beds available in public and private, general and specialized hospitals and rehabilitation centers. Hospitals are establishments permanently staffed by at least one physician. Establishments providing principally custodial care are not included. Rural hospitals, however, include health and medical centers not permanently staffed by a physician (but by a medical assistant, nurse, midwife, etc.) which offer in-patient accommodation and provide a limited range of medical facilities.

**Admissions per Hospital Bed**—Total number of admissions to or discharges from hospitals divided by the number of beds.

## HOUSING

**Average Size of Household (persons per household)—total, urban, and rural**—A household consists of a group of individuals who share living quarters and their main meals. A boarder or lodger may or may not be included in the household for statistical purposes.

**Average Number of Persons per Room—total, urban, and rural**—Average number of persons per room in all urban, and rural occupied conventional dwellings, respectively. Dwellings exclude non-permanent structures and unoccupied parts.

**Percentage of Dwellings with Electricity—total, urban, and rural**—Conventional dwellings with electricity in living quarters as percentage of total, urban, and rural dwellings respectively.

## EDUCATION

### Adjusted Enrollment Ratios

**Primary school - total, male and female**—Gross total, male and female enrollment of all ages at the primary level as percentages of respective primary school-age populations. While many countries consider primary school age to be 6-11 years, others do not. The differences in country practices in the ages and duration of school are reflected in the ratios given. For some countries with universal education, gross enrollment may exceed 100 percent since some pupils are below or above the country's standard primary-school age.

**Secondary school - total, male and female**—Computed as above, secondary education requires at least four years of approved primary instruction; provides general, vocational, or teacher training instructions for pupils usually of 12 to 17 years of age; correspondence courses are generally excluded.

**Vocational Enrollment (percent of secondary)**—Vocational institutions include technical, industrial, or other programs which operate independently or as departments of secondary institutions.

**Pupil-teacher Ratio - primary, and secondary**—Total students enrolled in primary and secondary levels divided by numbers of teachers in the corresponding levels.

## CONSUMPTION

**Passenger Cars (per thousand population)**—Passenger cars (comprise motor cars seating less than eight persons; excludes ambulances, hearses and military vehicles).

**Radio Receivers (per thousand population)**—All types of receivers for radio broadcasts to general public per thousand of population; excludes un-licensed receivers in countries and in years when registration of radio sets was in effect; data for recent years may not be comparable since most countries abolished licensing.

**TV Receivers (per thousand population)**—TV receivers for broadcast to general public per thousand population, excludes unlicensed TV receivers in countries and in years when registration of TV sets was in effect.

**Newspaper Circulation (per thousand population)**—Shows the average circulation of "daily general interest newspaper," defined as a periodical publication devoted primarily to recording general news. It is considered to be "daily" if it appears at least four times a week.

**Cinema Annual Attendance per Capita per Year**—Based on the number of tickets sold during the year, including admissions to drive-in cinemas and mobile units.

## LABOR FORCE

**Total Labor Force (thousands)**—Economically active persons, including armed forces and unemployed but excluding housewives, students, etc., covering population of all ages. Definitions in various countries are not comparable, 1960, 1970 and 1983 data.

**Female (percent)**—Female labor force as percentage of total labor force.

**Agriculture (percent)**—Labor force in farming, forestry, hunting and fishing as percentage of total labor force; 1960, 1970 and 1980 data.

**Industry (percent)**—Labor force in mining, construction, manufacturing and electricity, water and gas as percentage of total labor force; 1960, 1970 and 1980 data.

**Participation Rate (percent)—total, male, and female**—Participation or activity rates are computed as total, male, and female labor force as percentages of total, male and female population of all ages respectively; 1960, 1970, and 1983 data. These are based on ILO's participation rates reflecting age-sex structure of the population, and long time trend. A few estimates are from national sources.

**Economic Dependency Ratio**—Ratio of population under 15 and 65 and over, to the working age population (those aged 15-64).

## INCOME DISTRIBUTION

**Percentage of Total Disposable Income (both in cash and kind)**—Accruing to percentile groups of households ranked by total household income.

## POVERTY TARGET GROUPS

The following estimates are very approximate measures of poverty levels, and should be interpreted with considerable caution.

**Estimated Absolute Poverty Income Level (US\$ per capita)—urban and rural**—Absolute poverty income level is that income level below which a minimal nutritionally adequate diet plus essential non-food requirements is not affordable.

**Estimated Relative Poverty Income Level (US\$ per capita)—urban and rural**—Rural relative poverty income level is one-third of average per capita personal income of the country. Urban level is derived from the rural level with adjustment for higher cost of living in urban areas.

**Estimated Population Below Absolute Poverty Income Level (percent)—urban and rural**—Percent of population (urban and rural) who are "absolute poor."

OUTPUT, LABOR FORCE, AND  
PRODUCTIVITY IN FY1985

	Value Added		Labor Force		V. A. Per Worker
	\$ Million	%	Million	%	US\$
Agriculture a/	3,050	48.0	9.8	66.3	318
Industry b/	814	12.8	1.6	10.3	509
Services/Trade	2,483	39.2	3.5 u/	23.4 c/	712
TOTAL	6,357	100.0	14.9	100.0	427

GOVERNMENT FINANCE

	Public Sector		Union Government	
	Kyats Million	% of GDP	Kyats Million	% of GDP
	FY85	FY85	FY85	FY85
Current Receipts	8,693 d/	16.1 d/	7,081	13.1
Current Expenditures	7,387	13.7	7,215	13.4
Current Surplus	1,306	2.4	-134	0.2
Capital Expenditures	8,047 e/	14.9 e/	2,254	4.2
Overall Deficit	6,535	12.1	2,182	4.0
External Assistance (gross)	2,604	4.8	..	..

MONEY, CREDIT, AND PRICES

(Kyats million outstanding at end of period)	1979 March	1980 March	1981 March	1982 March	1983 March	1984 March	1985 March
Money and Quasi Money	8,017	9,619	11,213	13,135	14,797	17,107	19,711
Bank Credit to Public Sector	7,194	8,990	10,885	13,487	15,713	18,086	21,902
Bank Credit to Private Sector	1,728	1,653	1,651	1,749	1,687	2,043	2,170
(Percentages or Index Numbers)							
Money and Quasi Money as % of GDP	25.2	27.2	29.0	30.7	31.5	34.2	36.5
CY Average Consumer Price Index at Rangoon, (1978 = 100)	106.1	107.2	107.5	112.0	118.3	124.0	129.7 f/
Percentage Changes in:							
Consumer Price Index at Rangoon, Annual Average	5.0	0.6	0.3	5.3	5.7	4.8	6.7 g/
Bank Credit to Public Sector, March/March	9.8	25.0	21.1	23.9	16.5	5.1	21.1
Bank Credit to Private Sector, March/March	1.3	-4.3	-0.1	5.9	-3.5	21.1	6.2

\*All data for FY83 (1983-84) are revised estimates of the Government of Burma.

- a/ Includes livestock, fishery, and forestry.  
b/ Includes mining, power, and construction.  
c/ Includes workers not elsewhere specified.  
d/ Includes current surplus/deficit of public corporations.  
e/ Includes capital expenditures of public corporations.  
f/ Average Jan/June 1985.  
g/ Change in first half of year.

.. not available

BALANCE OF PAYMENTS

	<u>FY83</u>	<u>FY84</u>	<u>FY85</u>
	(US\$ Million)		
Exports (GNFS)	423.4	453.5	448.4
Imports (GNFS)	949.7	669.6	699.5
Resource Balance	-526.3	-216.1	-251.1
Net Factor Income	-44.7	-63.6	-63.0
Net Current Transfer	23.7	47.2	23.4
Current Account Balance	-547.3	-232.5	-290.7
Official Grant Aid	77.6	65.8	75.6
Net M&LT Loans (DRS)	324.3	177.3	186.0
Disbursements	423.7	303.2	309.9
Repayments	99.4	125.9	123.9
Short-term Capital	0.7	-0.4	0.0
Other Medium & Long Term Capital <sup>a/</sup>	-13.0	8.3	-17.2
Overall Balance	-157.7	18.5	-46.3
Gross Reserves (end-March)	78.9	114.9	54.5
Net Reserves (end-March)	1.5	20.0	-26.4

RATE OF EXCHANGE1982 (End of Calendar Year)

SDR 1.00 = K 8.51  
US\$1.00 = K 7.78

1983 (End of Calendar Year)

SDR 1.00 = K 8.51  
US\$1.00 = K 8.22

1984 (End of Calendar Year)

SDR 1.00 = K 8.51  
US\$1.00 = K 8.75

1985 (End of Calendar Year)

SDR 1.00 = K 8.51  
US\$ 1.00 = K 7.84

MERCHANDISE EXPORTS (FY85)

	<u>\$ Million</u>	<u>₹</u>
Rice and Rice Products	156	39.1
Teak	104	26.1
Pulses and Beans	30	7.5
Base Metals and Ores	30	7.5
Animal Feedstuff	7	1.8
All Other Commodities	<u>72</u>	<u>18.0</u>
TOTAL	399	100.0

EXTERNAL DEBT, March 31, 1986

	<u>US\$ Million</u>
Outstanding and Disbursed	2,219.3
Outstanding, including Undisbursed	3,280.0

DEBT SERVICE RATIO FOR FY1985

	<u>₹</u>
Ratio of debt service to exports of goods and services (excluding IMF)	42.4

IBRD/IDA LENDING, March 31, 1986 (US\$ Million)

	<u>IBRD</u>	<u>IDA</u>
Outstanding and Disbursed	--	409.7
Undisbursed	--	287.3
Outstanding, including Undisbursed	--	697.0

<sup>a/</sup> Includes errors and omissions.

South Asia Programs Department  
Division A  
July 23, 1986

STATUS OF IBRD/IDA OPERATIONS IN BURMASTATEMENT OF IBRD LOANS AND IDA CREDITS (As of March 31, 1986)

<u>Loan or Credit No.</u>	<u>Year</u>	<u>Borrower</u>	<u>Purpose</u>	<u>US\$ Million</u>		
				<u>Amount (less cancellation)</u>		
				<u>IBRD</u>	<u>IDA</u>	<u>Undisbursed</u>
Three loans and ten credits fully disbursed				33.12	160.11	--
835	1978	Burma	Paddyland Development II	-	34.5	14.38
879	1978	Burma	Rubber Rehabilitation	-	4.5	0.40
949	1979	Burma	Forestry II	-	35.0	11.68
958	1979	Burma	Telecommunications II	-	35.0	4.11
1031	1980	Burma	Kinda (Nyaunggyat) Dam	-	90.0	18.97
1092	b/ 1981	Burma	Grain Storage	-	23.0	5.02
1114	b/ 1981	Burma	Wood Industries I	-	32.0	4.39
1245	b/ 1982	Burma	Power I	-	80.0	40.64
1253	b/ 1982	Burma	Construction Industry I	-	20.0	6.87
1315	b/ 1983	Burma	Tank Irrigation	-	19.0	12.73
1372	b/ 1983	Burma	Third Port Project	-	50.0	51.46
1381	b/ 1983	Burma	Groundwater Project I	-	14.0	14.02
1385	b/ 1983	Burma	Rubber Rehabilitation II	-	9.0	8.69
1425	b/ 1984	Burma	Textile Finishing Plant	-	29.7	30.99
1444	b/ 1984	Burma	Wood Industries II	-	25.0	25.77
1615	c/ 1985	Burma	Timber Distribution	-	17.75	20.49
1616	c/ 1985	Burma	Seed Development II	-	14.50	16.65
Total				33.12	693.06	287.26
of which has been repaid				<u>33.12</u>	<u>1.99</u>	
Total now outstanding				-	<u>691.07</u>	
Amount sold				2.74		
of which has been repaid				<u>2.74</u>	-	
Total now held by IBRD & IDA <u>a/</u>				-	<u>691.07</u>	
Total Undisbursed						<u>287.26</u>

- a/ Prior to exchange adjustments.  
b/ IDA Sixth Replenishment Credits.  
c/ IDA Seventh Replenishment Credits.

Items (b) and (c) show principal amounts in US dollars equivalent at date of negotiations as shown in the President's Reports, and undisbursed amounts shown in US dollars equivalent at the rate of exchange for the SDR on March 31, 1986.

BURMA

YE-U IRRIGATION REHABILITATION AND MODERNIZATION PROJECT

Supplementary Project Data Sheet

Section I: Timetable of Key Events

(a) Time Taken by the Country to Prepare the Project:

Two years

(b) Agencies Preparing the Project:

ID and IDA, assisted by FAO/CP

(c) Date of First Presentation to the Association:

May 1984

(d) Date of Departure of Appraisal Mission:

November 1984

(e) Date of Completion of Negotiations:

June 1986

(f) Planned Date of Effectiveness:

November 1986

Section II: Special IDA Implementation Action

None

Section III: Special Conditions

- A. Condition of Effectiveness: Arrangements satisfactory to IDA have been made with UNDP to finance technical assistance (para. 45).
- B. Other Conditions:
- (a) The Government would establish a Project Coordination Committee chaired by the Deputy Minister, MAF (para. 40).
  - (b) The Government would establish a Project Unit comprising senior technical officers of ID and AC (para. 41).
  - (c) The ID would appoint a Project Director by October 31, 1986 (para. 41).
  - (d) The AC would extend the Special High Yielding Program to include the full project area by September 30, 1987 (para. 42).
  - (e) The Government would provide sufficient funds for O&M of the Ye-U system, based on an annual review with IDA (para. 49).
  - (f) The Government would make direct or indirect recovery of O&M costs of the project, review periodically cost recovery performance, and furnish its findings to IDA (para. 51).

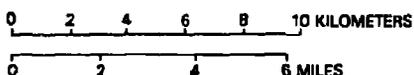
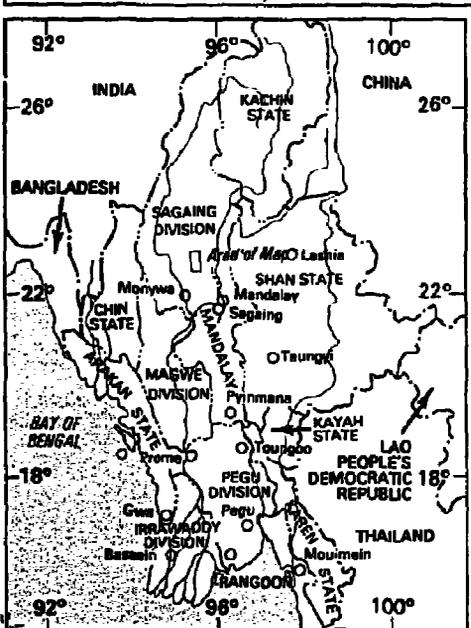
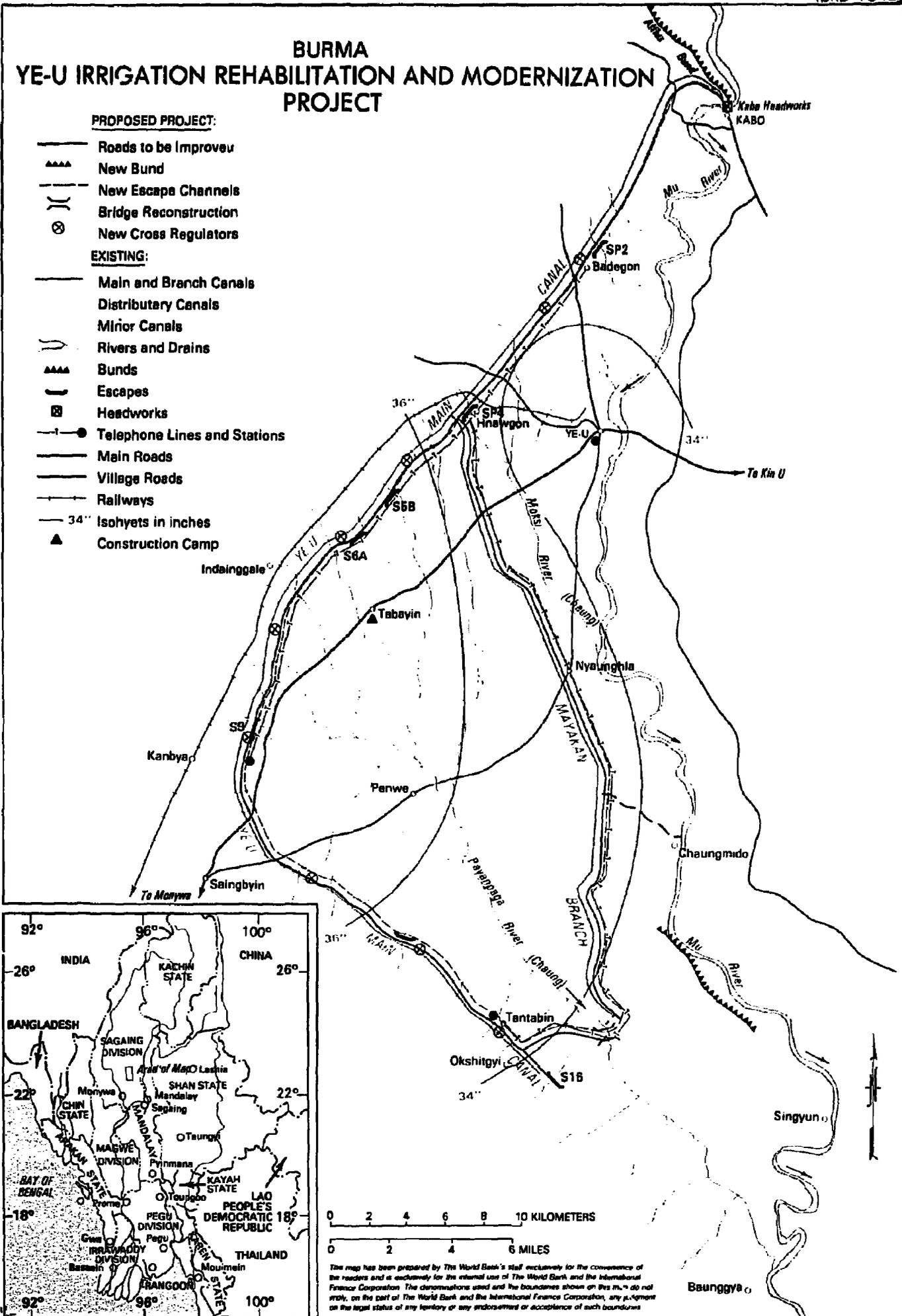
# BURMA YE-U IRRIGATION REHABILITATION AND MODERNIZATION PROJECT

**PROPOSED PROJECT:**

- Roads to be Improved
- New Bund
- New Escape Channels
- Bridge Reconstruction
- New Cross Regulators

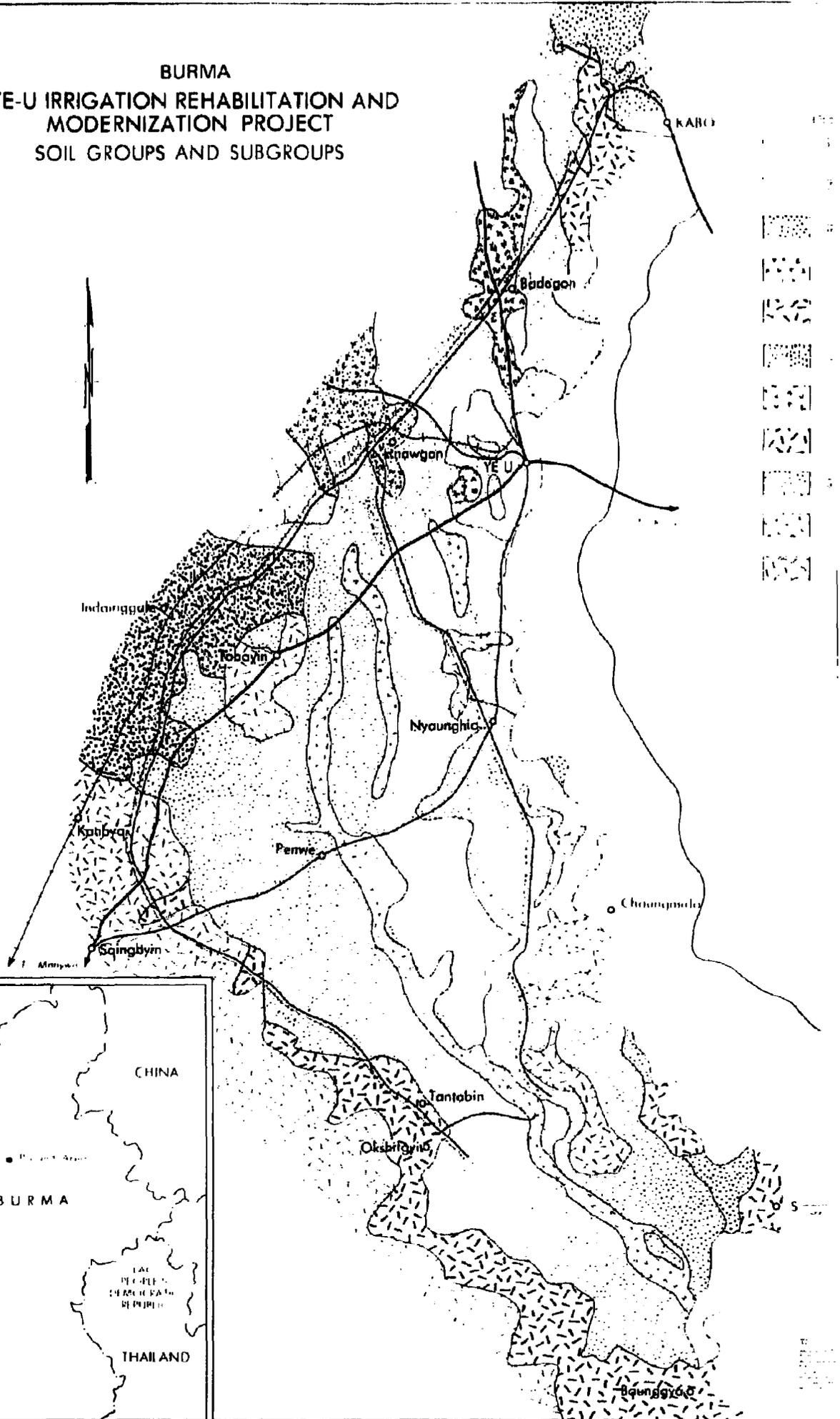
**EXISTING:**

- Main and Branch Canals
- Distributary Canals
- Minor Canals
- Rivers and Drains
- Bunds
- Escapes
- Headworks
- Telephone Lines and Stations
- Main Roads
- Village Roads
- Railways
- Isohyets in inches
- Construction Camp



The map has been prepared by The World Bank's staff exclusively for the convenience of the readers and is exclusively for the internal use of The World Bank and the International Finance Corporation. The circumstances used and the boundaries shown on this map do not imply, on the part of The World Bank and the International Finance Corporation, any agreement on the legal status of any territory or any endorsement or acceptance of such boundaries.

BURMA  
 YE-U IRRIGATION REHABILITATION AND  
 MODERNIZATION PROJECT  
 SOIL GROUPS AND SUBGROUPS



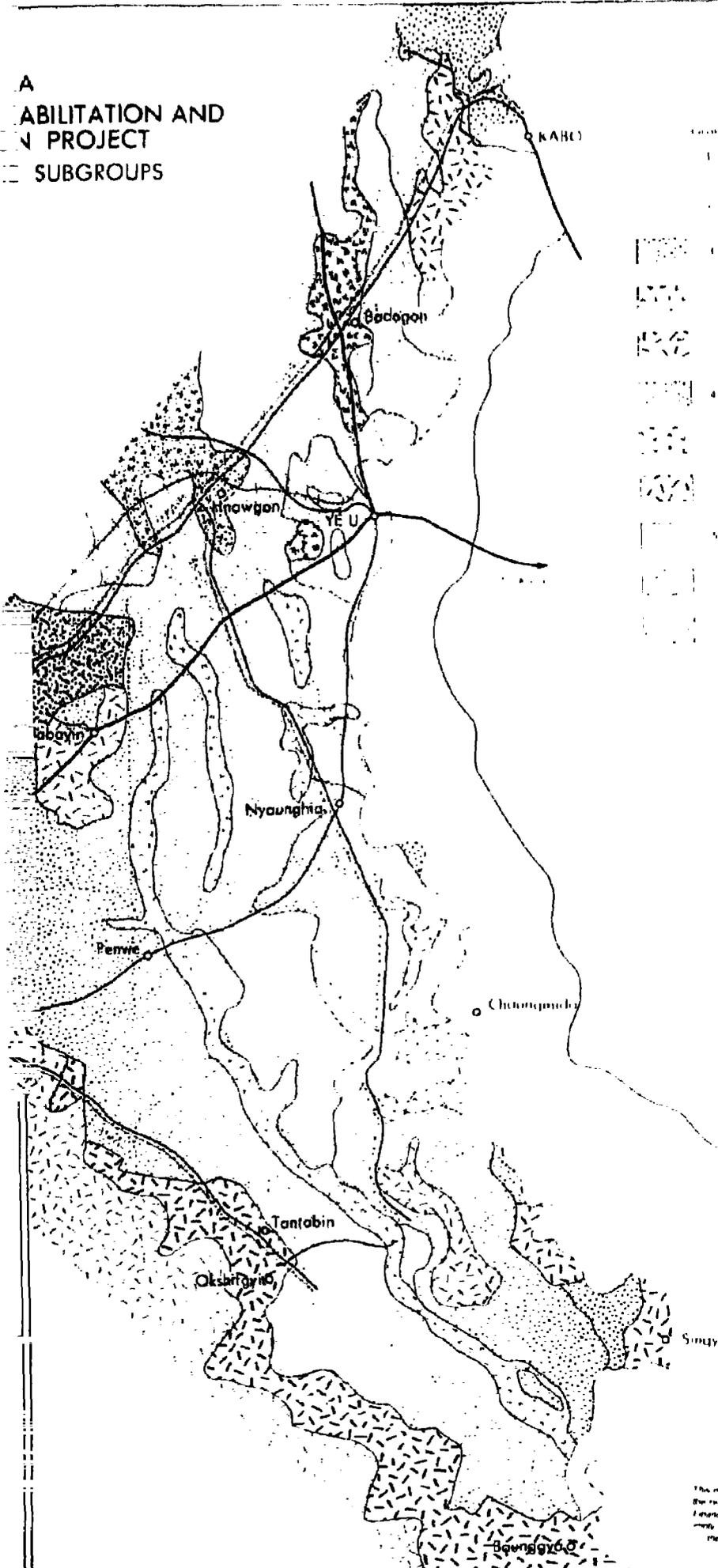
**A**  
**ABILITATION AND**  
**N PROJECT**  
**SUBGROUPS**

**SOIL GROUPS AND SUBGROUPS**

Group	Subgroup	Characteristics
1		Very dark phase of the soil subject to deep leaching and erosion.
2		Very dark phase of the soil subject to deep leaching and erosion.
3	3A	Very dark, moist, fine textured soil on recent alluvium, slightly smooth, usually less than 10%.
	3B	Very dark, moist, fine textured soil on recent alluvium, slightly smooth, usually less than 10%.
	3B-M	3B soil with some coarse granules, phase.
4	4B	Dark, moist, very fine textured soil on recent alluvium, slightly smooth, usually less than 10%.
	4C	Dark, moist, very fine textured soil on recent alluvium, slightly smooth, usually less than 10%.
	4B-M	4B soil with some coarse granules, phase.
5		Dark, moist, dark grey, fine textured soil on recent alluvium, slightly smooth, usually less than 10%.
	5A	Dark, moist, dark grey, fine textured soil on recent alluvium, slightly smooth, usually less than 10%.
	5B	Dark, moist, dark grey, fine textured soil on recent alluvium, slightly smooth, usually less than 10%.
	5B-M	Dark, moist, dark grey, fine textured soil on recent alluvium, slightly smooth, usually less than 10%.

- ROAD
- RAILROAD
- MAJOR ROAD
- MINOR ROAD
- RAILROAD
- RAILROAD

Scale: 1:50,000  
 Date: 1980



The map has been prepared by the Ministry of Agriculture for the purpose of the rehabilitation and development of the area. The data shown on the map are based on the information available at the time of the preparation of the map. The Ministry of Agriculture is not responsible for any errors or omissions on the part of the Ministry or the Government of the Republic of the Philippines. The map is not to be used for any other purpose without the prior written consent of the Ministry of Agriculture.

